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(54) Abstract Title
Display for vehicle climate control system

(57) The motor vehicle climate control system has a display with a portion 1 which shows the operational functions of the system which are currently controlled in automatic mode and a portion 2 which shows those operational functions which are under manual control. When a function is changed from automatic control to manual control or vice versa the symbol for that function is deleted from one portion and appears in the other. For example the symbol 4 will be present in portion 1 if the fan blower is under automatic control and the corresponding manual symbol icon 7 will appear in portion 2 if the fan is switched to manual control.

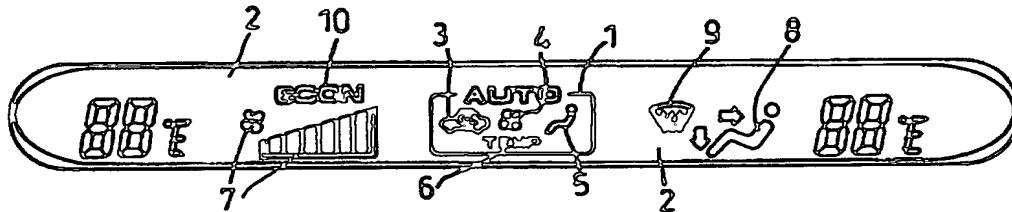


Fig. 1

1/2

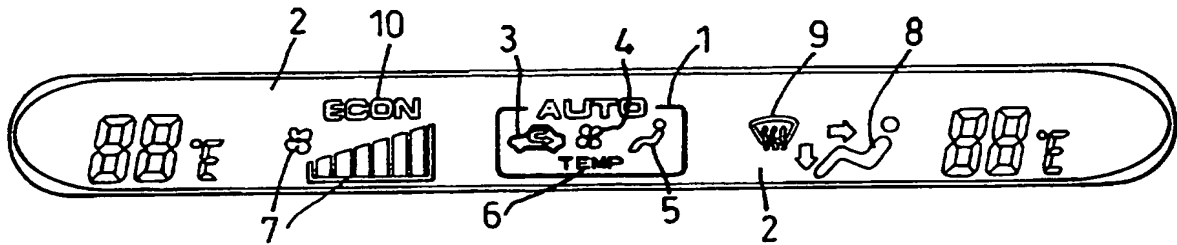


Fig. 1

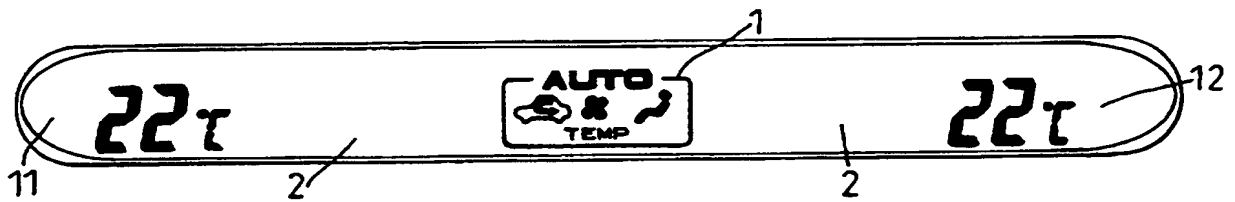


Fig. 2

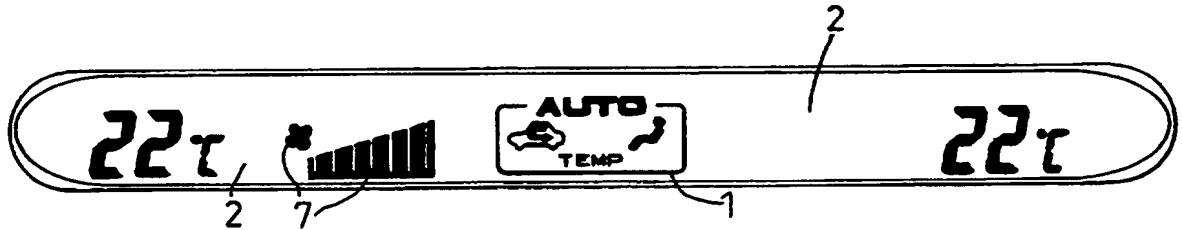


Fig. 3

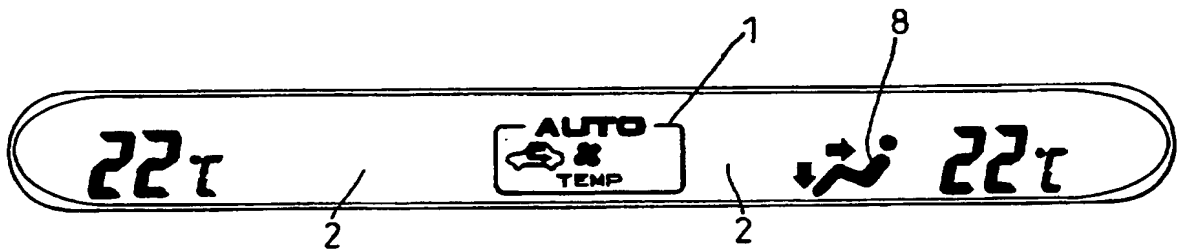


Fig. 4

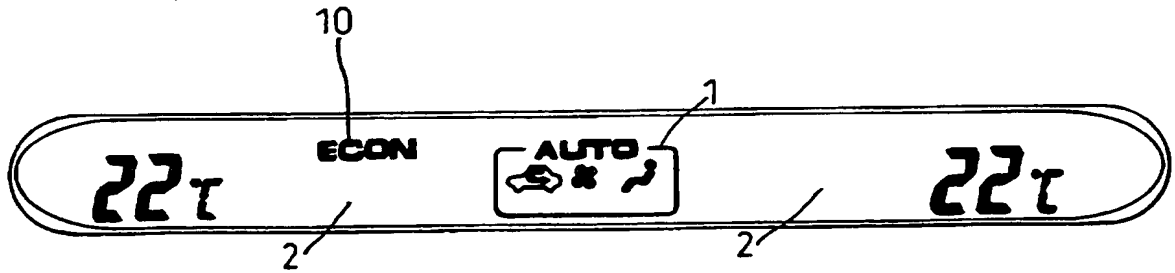


Fig. 5

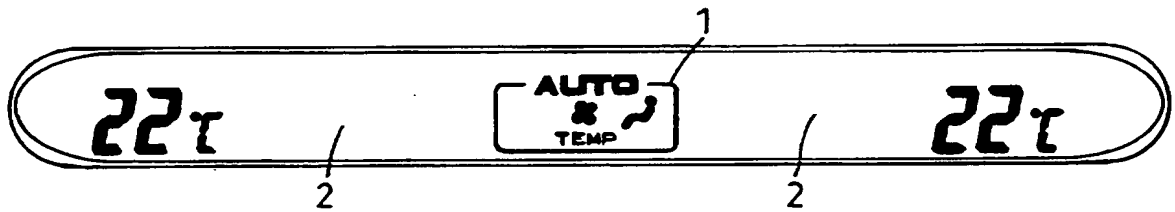


Fig. 6

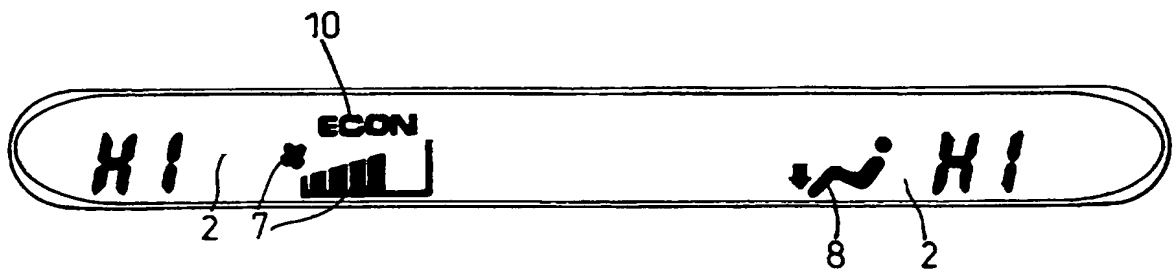


Fig. 7

A VISUAL DISPLAY ARRANGEMENT

The present invention relates to a visual display arrangement and more particularly to a visual display arrangement for a motor vehicle climate control system.

Increasingly, motor vehicles are including more sophisticated climate
5 control systems to improve occupant comfort. Inherently, these climate control systems include an automatic state and a manual override in order to allow the occupant to retain specific control when required. Unfortunately, with increasing sophistication, the climate control system within a motor vehicle may include a wide range of functional operations.
10 some of which are in an automatic control state whilst others are manually adjusted. Presentation of the current status with regard to these various functional operations of the climate control system can be difficult particularly within a motor vehicle where the driver must not be overly distracted by the complication of the display arrangement.

15 It is an object of the present invention to provide a visual display arrangement particularly for a motor vehicle climate control system which displays climate control system status in a more appropriate manner.

In accordance with the present invention there is provided a visual display arrangement for a motor vehicle climate control system, the display

arrangement including respectively an in-automatic mode portion and an in-manual mode portion, said in-automatic mode portion and in-manual mode portion including reciprocal icon symbols representative of functional operations of the climate control system to indicate respectively whether
5 that functional operation is in automatic or in manual status, said system configured to ensure any functional operation is only actively displayed in the respective mode portion indicative of its current automatic or manual status.

Typically, the in-manual mode portion of the arrangement will include
10 additional icon symbols indicative of functional operations of a manual status which have consequential effect upon an automatic functional operation and so precipitate either deactivation of the symbol icon in the automatic mode portion or alteration of the representation of that symbol icon associated with the automatic function or operation effected.

15 An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawing, in which:

Figure 1 is a pictorial representation illustrating a display arrangement with all icons illuminated;

Figure 2 is a pictorial illustration of the display arrangement in full automatic mode;

Figure 3 is a pictorial representation of the display arrangement when the climate control system is substantially in automatic mode but with the
5 fan blower in manual operation;

Figure 4 is a pictorial representation of the display arrangement when the automatic climate control system is substantially in automatic mode but with the air distribution in manual operation;

Figure 5 is a pictorial representation of the display arrangement with
10 the climate control system substantially in automatic mode but with manual "economy" selected;

Figure 6 is a pictorial representation of the display arrangement with the climate control system substantially in automatic mode but manual air recirculation selected; and

15 Figure 7 is a pictorial representation of the display arrangement under full manual control.

The majority of automatic climate control systems include a combination of button control and LED or LCD display arrangements to

show the status of functional operations such as set temperature, automatic control and manual control. Typically, when a system is in full automatic mode, then the display arrangement will show only the set temperature and an "auto" graphic or LED tell-tale illumination on the automatic mode
5 selection button. However, when one manual function such as blower operation is selected, then typically the "auto" graphic or LED tell-tale illumination is removed so it is unclear whether other functions of the climate control system remain in automatic control mode as viewed by a vehicle occupant. This problem is compounded by the presence of several
10 manual override operational functions that users can select to suit their individual preferences. For example, manual override for the following functional operations are common within motor vehicles:

a) air outlet - to control where the airflow is distributed (screen, feet/screen, feet, feet/face, face);

15 b) air volume - to control fan blower speed;

c) air inlet - to control fresh or recirculated air or the proportioning of the two;

d) temperature - to give either maximum heating or cooling from the climate control system;

e) economic vehicle performance - to control the air-conditioning compressor between on and off in order to remove that compressors load upon the vehicle engine and so alter fuel economy for the vehicle.

It will be appreciated that confusion with regard to vehicle occupants
5 and in particular the driver can create distraction and therefore a reduction in driver awareness and so less safe operation of the vehicle. The visual display arrangement must allow the occupant of the vehicle to readily appreciate by a simple glance, the current climate control system operational status.

10 In accordance with the present invention, a visual display arrangement is provided in which the arrangement is essentially divided into respective portions representative of in automatic and in manual control. Thus, an in-automatic portion and an in-manual portion are defined within the visual display arrangement. These portions typically include respective symbol
15 icons representative of climate control systems operational function which are only activated or illuminated when that particular function is operational in respectively the automatic or the manual status. Reciprocal symbol icons for the same functional operation cannot be activated or illuminated in both the in-automatic portion and the in-manual portion at
20 the same time.

Thus, when an operational function of the climate control system is manually selected, the icon symbol for that operational function is extinguished from the in-automatic portion of the display arrangement and then displayed in the in-manual portion of the display arrangement. The
5 in-automatic portion of the display arrangement is completely extinguished when all operational functions of the climate control system are manually selected.

Figures 1 to 7 illustrate the present visual display arrangement for a climate control system. In Figure 1 all the symbol icons for functional
10 operations of the climate control system are illuminated. It will be appreciated that such a situation is not normal and may only occur during initial start up of the climate control system to check adequate operation of the display arrangement. In Figure 1 an in-automatic portion 1 is centrally located with in-manual portions 2 either side. It will be appreciated that
15 such a representation may be conveniently be viewed by a brief glance from a vehicle occupant, ie. driver.

In the in-automatic portion 1, a legend "auto" is illuminated to distinguish this portion 1 from the surrounding in-manual portions 2. Within the portion 1 there is located a symbol icon for vehicle air
20 recirculation 3, fan blower 4, air distribution 5 and temperature control 6. These symbol icons 3, 4, 5, 6 are only illuminated when their respective

functional operation of the climate control system are automatically controlled by that climate control system. Reciprocally, the in-manual portion 2 of the display arrangement include symbol icons for functional operations. Thus, icon 7 relates to fan blower operation, icon 8 relates to air distribution whilst further icons are provided for functional operations not generally automatically controllable, but manually settable, ie. icon 9 for demist override and icon 10 for disablement of the air-conditioning compressor to facilitate engine fuel economy as described previously. Normally the display arrangement will also include representations of the temperature within the vehicle or exterior to the vehicle as required. Thus, numerical temperature representations will be provided at either end 11, 12 of the display arrangement representative of such temperatures.

In Figure 2, the display arrangement is depicted with all operational functions of the climate control system in automatic mode. Thus, the icons 3, 5, 6 are all illuminated and no icon in the in-manual portion 6 of the display arrangement are activated or illuminated. In such circumstances, an occupant of the motor vehicle through a brief glance at the display arrangement will see that the climate control system is in a fully automatic state.

In Figure 3, the display arrangement is illustrated with fan blower operation in a manual mode such that the in-automatic section 1 of the

display arrangement has icons 3, 5, 6 illuminated, whilst the in-manual portion 2 of the display arrangement includes the icon 7 representing manual operation of the fan blower. It will be seen that this icon 7 is constituted by an impeller symbol along with a graphic representative of manually set fan blower speed. Again, from a brief glance at the display arrangement, it will be noted that generally the climate control system is in an automatic state whilst fan blower speed alone is manually set.

In Figure 4 the display arrangement is illustrated where air distribution from the climate control system is manually set. Thus, the in-automatic portion 1 illuminates icons 3, 4, 6 representative of air recirculation, fan blower speed and set temperature in order to illustrate that these operational functions are automatically determined by the climate control system whilst the in-manual portion 2 of the display arrangement icon 8 is illuminated to clearly indicate to an occupant of a vehicle that air distribution is currently manually set.

In Figure 5, the display arrangement is depicted wherein economic operation of the motor vehicle has been selected by the occupant. Thus, the air conditioning compressor of the climate control system will be made inoperative such that the climate control system cannot reliably achieve the desired set temperature and so the icon 6 representative of that automatic

control of temperature is extinguished and a reciprocal icon 10 is illuminated to indicate economic control of the climate control system.

In Figure 6 the visual display arrangement is depicted wherein air recirculation is manually controlled. In such circumstances, typically, an independent switch will be used in order to operate between full air recirculation, no air recirculation or a percentage of recirculated air and fresh external air. This independent switch will typically be illuminated in such circumstances and so it will not be necessary to provide an indicating icon in the in-manual portion 2 of the display arrangement. However, the air recirculation is no longer automatically controlled and so the icon 3 indicative of such automatic control by the climate control system is extinguished within the portion 1 of the display arrangement.

In Figure 7, full manual control of the climate control system is illustrated in the display arrangement by extinguishing the in-automatic portion 1 such that only icons 7, 8, 10 are illuminated in the in-manual portion 2. Such a configuration of the display arrangement will clearly indicate from a brief glance by an occupant of the vehicle the current climate control system operational status as being completely manual.

It will be noted that generally the icons 7-10 in the in-manual portion 2 of the display arrangement are larger than those within the in-automatic

portion 1 in order to further extenuate from a simple vehicle occupant glance current climate control system status. Furthermore, and where possible, differentials in illumination colour may be utilised to enhance such differentials.

- 5 It will be appreciated that determination of whether a functional operation of the climate control system is in automatic or in manual is a relatively simple logic process in that a switch will typically be activated in order to attain manual operation such that monitoring of that switch will provide the necessary stimulus for activation and deactivation of the
- 10 respective icons 3-10 of the display arrangement as required.

CLAIMS

1. A visual display arrangement for a motor vehicle climate control system, the display arrangement including respectively an in-automatic mode portion and an in-manual mode portion, said in-automatic mode portion and said in-manual mode portion including reciprocal symbol icons for functional operations of the climate control system to indicate respectively whether that functional operation is an in-automatic or in a manual status, said arrangement configured to achieve only the respective symbol icon of any functional operation is only actively displayed in the respective mode portion indicative of its current automatic or manual status.
2. An arrangement as claimed in Claim 1, wherein the in-manual mode portion of the display arrangement includes additional icon symbols indicative of the functional operation of a manual status which have consequential effect upon an automatic functional operation and so precipitate deactivation of symbol icons indicative of that automatic operation in the in-automatic mode operation of the display arrangement.
3. An arrangement as claimed in Claim 1 or Claim 2, wherein the symbol icons are representative of air recirculation, fan blower operation, air

distribution, set temperature operation, vehicle fuel economy (A/C compressor) operation, and vehicle demist operation.

4. A visual display arrangement substantially as hereinbefore described with reference to the accompanying drawings.
5. A motor vehicle including a visual display arrangement as claimed in any preceding claim.



Application No: GB 9815116.0
Claims searched: 1 - 3

Examiner: Tom Sutherland
Date of search: 30 December 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): B7H (HNR); G3N (NG1A3)

Int Cl (Ed.6): B60H 1/00

Other: Online: WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2252644 A (MERCEDES-BENZ) Note page 4 lines 7 to 14.	1 to 3

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.